SICK Service Manual

DFS60B-S1MA10000

1. Description

SICK DFS60B-S1MA10000 Incremental Encoder, 10,000 PPR, 6 x 10 mm Dia. Shaft, 4.5-32 V, Connector

2. Specifications

Specification	Value
Safety-related	parameters
MTTFD	(mean time to dangerous failure) 300 years (EN ISO 13849-1)
1)	This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40°C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no.
8015532.	
Performance	
Pulses	per revolution 10,000
Measuring	step 90°, electric/pulses per revolution
Measuring	step deviation at non binary
number	of lines
±	0.01°
Error	limits ± 0.05°
1)	See maximum revolution range.
Interfaces	
Communication	interface Incremental
Communication	Interface detail TTL / HTL
Factory	setting Factory setting: output level TTL
Number	of signal channels 6-channel
0-set	function via hardware pin ✓
0-SET	function H-active, L = 0 - 3 V, H = 4,0 - Us
V	1)
Programmable/configurable	
Initialization	time 32 ms, 30 ms
Output	frequency ≤ 600 kHz

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3. Product Information

SICK DFS60B-S1MA10000 Incremental Encoder, 10,000 PPR, 6 x 10 mm Dia. Shaft, 4.5-32 V, Connector

Product Specifications

Product Attribute

Attribute Value

Alternate Mfr Part Number 1056866

Brand SICK

Connection Type Male connector, radial, Male connector, radial

Duty Cycle ± 0.05°

Housing Material Aluminum die cast (stainless steel on request)

IP Rating IP67

Manufacturer Part Number DFS60B-S1MA10000

Maximum Load Current 30 mA

Maximum Operating Speed 9000 rpm

Operating Voltage 4.5 to 32 V

Output Frequency 600 kHz GHz

Pulse Per Revolution 10000 PPR

Series DFS60 Series

Shaft Size 6 x 10 mm

Start Up Time 32 ms (with mechanical zero pulse width)30 ms

Torque 0.3 N/cm

Type Incremental

Overview

DFS60 Series - Incremental Encoders

High-resolution, programmable encoder for sophisticated applications

The DFS60 is a high-resolution incremental encoder with a diameter of 60 mm. It offers a wide variety of customer-specific mechanical and electric adjustments. Programming of the output signal, zero pulse and resolution of up to 65,356 pulses is a unique feature for the market. The high enclosure rating, wide temperature range and large ball bearing distance make the DFS60 the ideal encoder for industrial applications in harsh environments.

At a Glance

●Compact installation depth

●High resolution up to 16 bits

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●Optionally programmable: Output voltage, zero pulse position, zero pulse width and number of pulses

●Connection: Radial or axial cable outlet, M23 or M12 connector, axial or radial

●Electrical interfaces: 5 V & 24 V TTL/ RS-422, 24 V HTL/push pull

●Mechanical interfaces: face mount or servo flange, blind or through hollow shaft

●Remote 0-SET possible

Detailed technical data

Safety-related parameters

MTTFD (mean time to dangerous failure) 300 years (EN ISO 13849-1)

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Performance

Pulses per revolution 10,000

Measuring step 90°, electric/pulses per revolution

Measuring step deviation at non binary number of lines

± 0.01°

Error limits ± 0.05°

1) See maximum revolution range.

Interfaces

Communication interface Incremental

Communication Interface detail TTL / HTL

Factory setting Factory setting: output level TTL

Number of signal channels 6-channel

0-set function via hardware pin ✔

0-SET function H-active, L = 0 - 3 V, H = 4,0 - Us V 1)

Programmable/configurable ✔

Initialization time 32 ms, 30 ms

Output frequency ≤ 600 kHz

Load current ≤ 30 mA

Power consumption ≤ 0.7 W (without load)

1) Only with devices with M23 connector in connection with electrical interfaces M, U, V and W.

2) With mechanical zero pulse width.

Electronics

Connection type Male connector, M23, 12-pin, radial

Supply voltage 4.5 ... 32 V

Reference signal, number 1

Reference signal, position 90°, electric, logically gated with A and B

Reverse polarity protection ✔

Short-circuit protection of the outputs ✔

1) Programming TTL with ≥ 5.5 V: short-circuit opposite to another channel or GND permissable for maximum 30 s.

2) Programming HTL or TTL with < 5.5 V: short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

Mechanics

Mechanical design Solid shaft, Servo flange

Shaft diameter 6 mm

With flat

Shaft length 10 mm

Weight + 0.3 kg

Shaft material Stainless steel

Flange material Aluminum

Housing material Aluminum die cast

Start up torque 0.5 Ncm (+20 °C)

Operating torque 0.3 Ncm (+20 °C)

Permissible shaft loading 80 N (radial)

40 N (axial)

Operating speed ≤ 9,000 min^{-1}

Moment of inertia of the rotor 6.2 gcm^2

Bearing lifetime 3.6 x 10^10 revolutions

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Angular acceleration ≤ 500,000 rad/s^2

1) Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

EMC According to EN 61000-6-2 and EN 61000-6-3

Enclosure rating IP67, Housing side, male connector (IEC 60529)

IP65, shaft side (IEC 60529)

Permissible relative humidity 90 % (Condensation not permitted)

Operating temperature range –40 °C ... +100 °C

–30 °C ... +100 °C

Storage temperature range –40 °C ... +100 °C, without package

Resistance to shocks 70 g, 6 ms (EN 60068-2-27)

Resistance to vibration 30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)